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A SYSTEMATIC REVIEW ON THE IMPACT OF BREASTFEEDING ON CANCER RISK, WEIGHT LOSS, CARDIOVASCULAR DISEASE, TYPE 2 DIABETES MELLITUS IN MOTHERS, AND THE ROLE OF FATHERS, MEDICAL PERSONNEL AND TRAINING IN BREASTFEEDING

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Abstract

Introduction

Breastfeeding has a significant impact on maternal health, in the long term it reduces the risk of certain cancers, cardiovascular diseases, type II diabetes, supports the process of weight loss after pregnancy and the formation of a strong bond between mother and child. In order to increase effectiveness among breastfeeding women, it is extremely important to educate them, as well as help from fathers and medical staff.

Aim of the study

Assessing the impact of breastfeeding on the risk of cancer, cardiovascular disease, type 2 diabetes in the mother and the role of fathers, medical personnel and training in the breastfeeding process.

Materials and Methods

A review of the literature collected in the PubMed database was conducted to gather information under the headings: "breastfeeding and cancer," "health benefits for breastfeeding mothers," "breastfeeding and cardiovascular disease risk reduction," "impact of breastfeeding on type II diabetes risk," "role of fathers in breastfeeding," "role of medical personnel in breastfeeding," and "strategies affecting breastfeeding."

Summary

The review discusses the benefits of breastfeeding for mothers, such as reducing the risk of breast, ovarian and endometrial cancer, cardiovascular disease, and type 2 diabetes. It highlights the relationship between the timing of breastfeeding and the onset of specific conditions, as well as the role of fathers and health care providers in the breastfeeding process.

The available data allow us to conclude that breastfeeding is an effective preventive health strategy, but further research is needed to understand the biological mechanisms and identify optimal supportive interventions.

Keywords: the benefits of breastfeeding for mothers, breastfeeding and cancer risk reduction, the role of fathers in the feeding process, the role of nurses and midwives in the feeding process.

Introduction:

Breastfeeding is an important public health resource. It has many socioeconomic benefits, as well as short-term and long-term health benefits for women and children. [1] Organizations such as the World Health Organization (WHO), the European Commission on Public Health (ECPH) and the American Academy of Pediatrics (AAP) recognize exclusive breastfeeding for the first 6 months of a child's life as the optimal feeding method. [2]

Breast milk is the baby's source of essential nutrients, vitamins, immunoactive molecules, metabolites, oligosaccharides and microbial components, extremely important for the development of the immune system. [13] Interestingly, breastfed infants have a lower risk of childhood overweight/obesity, compared to infants fed modified milk. Studies indicate that infants who are breastfed for 1 year of life are more responsive to feelings of satiety when eating solid foods. [25]

Breastfeeding has many benefits for the mother as well. It is believed that the risk of hypertension, hyperlipidemia, diabetes, metabolic syndrome and cardiovascular disease decreases in women who breastfeed. [15] Of utmost importance is the fact that breastfeeding is a modifiable determinant of the development of certain types of cancer. Lack of or insufficient breastfeeding can disrupt the regulation of endogenous female sex hormones, damage maternal DNA, and impair the immune, anti-inflammatory and antimicrobial responses in children. [12]

Breastfeeding and the risk of developing breast cancer

Cancer is a significant public health challenge, generating a huge health and economic burden. It is the second leading cause of death worldwide. There is new evidence that points to the role of maternal reproductive health in cancer risk and breastfeeding is emerging as a factor in the development of some types of cancer. [12]

The link between breastfeeding and breast cancer is increasingly being studied. A large body of research shows that breastfeeding, especially long-term breastfeeding, is associated with a reduced risk of breast cancer. [4]

Breastfeeding reduces breast cancer risk by 22%(OR 0.78, 95% CI 0.74-0.82) compared to not breastfeeding. [4]

Breastfeeding for <6 months reduces the risk of developing breast cancer by 7% (OR 0.93, 95% CI 0.88-0.99), and the time range of 6-12 months by 9% (OR 0.91, 95% CI 0.87-0.96), compared to not breastfeeding. Mothers who breastfed for more than 1 year, compared to those who did not breastfeed at all, had a 26% (50 studies; OR 0.74, 95% CI 0.69-0.79) lower risk of developing breast cancer, while limiting the risk to high-quality studies only (41 studies) was 23% (OR 0.77, 95% CI 0.72-0.83). However, there was evidence of publication bias. [4]

An evaluation of the effect of breastfeeding on breast cancer risk in studies conducted in rich countries, with large sample sizes, cohort designs, with adequate quality and control for confounding factors, indicated a lower risk of developing the condition. [8] An analysis that included women who had given birth at least once in their lives showed a 7% reduction in breast cancer risk (OR 0.93, 95% CI 0.89-0.97) [4].
There is also connection between insufficient milk production during breastfeeding, in women who have given birth, and the risk of developing breast cancer The results described in the article relate to the analysis of the association between insufficient milk production and breast cancer risk in pre- and post-menopausal women. [8]

Pre-menopause:
In studies that compared premenopausal women who struggled with inadequate milk production with women who were lactating effectively, OR values ranged from 1.0-16.3, meaning that in some studies the risk of breast cancer was higher in women with inadequate milk production compared to women with normal lactation efficiency. However, given that some studies had OR=1, these conclusions are inconclusive. [8]
The I2 value was 78%, which may indicate that there was considerable heterogeneity in the study results. This level of heterogeneity indicates that differences between studies maybe due to different methodologies, study populations, or other factors, rather than just chance.
Considering other factors (e.g., age, lifestyle), the results for OR ranged from 0.9 to 3.1. Only one study had a result whose confidence interval excluded a value of zero, suggesting that there may be an association between insufficient milk production and a higher risk of premenopausal breast cancer. Nevertheless, other studies found no such effect-their confidence intervals included a value of 1.0.
There is a possible link between insufficient milk production and a higher risk of premenopausal breast cancer, but the results are heterogeneous and the evidence is inconclusive. [8].

After menopause
For postmenopausal women with milk production problems, the crude OR values ranged from 0.7 to 6.7. This means that in some studies the risk of breast cancer was higher in women with inadequate milk production, but overall the results were more variable, and only one study had an OR whose confidence interval excluded a value of zero.
The I2 value was 84%, indicating a high variability between the results of different studies. This situation may be due to various research factors.
After adjusting for other factors (e.g., age, lifestyle), the OR values for postmenopausal breast cancer were a range of 0.6 to 1.6. All confidence intervals included 1.0, meaning that no statistically significant association was found between insufficient milk production and postmenopausal breast cancer risk. [8]
For postmenopausal women, no clear link has been shown between insufficient milk production and breast cancer risk. Most studies suggest no such association. [8]

Breastfeeding and the risk of developing endometrial cancer

Endometrial cancer is one of the most common malignancies in women. Genetic, anthropometric and lifestyle factors can contribute to its incidence. The risk of endometrial cancer is also influenced by continuous exposure to estrogen, so menstrual history, number of births or exogenous hormones, is extremely important in the etiology of this disease. [5]

Breastfeeding is an important biological function of women, with many benefits for both mother and child. It may affect the risk of endometrial cancer due to the hormonal changes that occur during breastfeeding. [5]

According to a meta-analysis by: Baojian Zhan, Xiaoqin Liu, Fang Li, Dongfeng Zhang breastfeeding statistically reduces the risk of endometrial cancer. The authors observed a linear relationship between time and breastfeeding and the risk of endometrial cancer-it decreased by 1.2% with each month of breastfeeding. [5] They found a strong correlation between breastfeeding and endometrial cancer risk in Asia (RR = 0.57, 95% CI 0.37-0.87). The results in Asia differ significantly from those in Europe and North America, due to different lifestyles and cultural differences. In Asia, women breastfeed more often and for longer. Genetic differences and higher BMI in Europe and North America may explain these differences. [5]

According to Lianlian Wang, the meta-analysis indicates a reduction in the risk of endometrial cancer in lactating women. Although the results are promising, while further studies, particularly prospective ones, are needed to confirm the conclusions. Limitations of the meta - analysis include the possibility of bias in retrospective studies and differences in the inclusion of confounding factors. [7]

Breastfeeding and ovarian cancer

Ovarian cancer is a major health problem, with a 5-year survival rate of less than 50%, mainly due to late detection of the condition. Prevention is key to reducing mortality. There are few modifiable risk factors for ovarian cancer, one of the most well-known being the use of oral contraceptives, so it is extremely important to search for new ones. Many studies have shown an association between breastfeeding and ovarian cancer risk, with some showing a significant decrease in risk and others showing no association. [11]

The study by Ana Babic included 9973 women with ovarian cancer and 13,843 controls. Breastfeeding reduced the risk of invasive ovarian cancer by 24% (odds ratio [OR] 0.76). Breastfeeding, regardless of the number of deliveries, reduced the risk of ovarian cancer, especially of the highly malignant types: serous and endometrioid. Breastfeeding duration, especially beyond 12 months, was associated with a 34% lower risk. Risk reduction was observed even after 30 years of breastfeeding. [11]

The association between breastfeeding and ovarian cancer risk varied significantly depending on the continent where the study was conducted. In North America (integrated RR=0.68, 95%CI: 0.61-0.74), Asia (integrated RR=0.62, 95%CI: 0.45-0.84), and Australia (integrated RR=0.78, 95%CI: 0.68-0.90), breastfeeding significantly reduced the risk of ovarian cancer in lactating women regardless of the time period, while in Europe, breastfeeding reduced the risk of ovarian cancer to a statistically insignificant extent (integrated RR=0.83, 95%CI: 0.67-1.02). [6]

Effect of breastfeeding on women's weight loss after childbirth

The study included 68 adolescent mothers (aged 15 to 19 years), 64 adult mothers (aged 20 to 29 years). Anthropometric measurements were taken after: 15, 90, 180 and 365 days postpartum. EBF is the term for exclusive breastfeeding for a period of 4 months, without the introduction of water, milk, juice, non-human milk or food into the baby's diet. It was noted that women who exclusively breastfed reported greater weight loss in the postpartum period compared to mothers who did not practice EBF. In addition, these women were more likely to return to their pre-pregnancy weight within the first year after delivery. The weight loss was associated with lower energy intake and longer duration of EBF. [16]

Duration of exclusive breastfeeding was a major predictor of maternal weight loss. Mothers with higher levels of education, who had natural childbirth, and mothers in married couples were more likely to practice EBF. Women's age alone had no significant effect on weight changes. [16]

Breastfeeding and the risk of cardiovascular disease and diabetes

The study, authored by Lena Tschiderer, among others, identified 8 relevant prospective studies involving a total of 1,192,700 multiparous women (weighted mean age: 51.3 years at the start of the study, 24.6 years at the time of the first birth. Weighted mean number of births: 2,3). Among this group of women, 982,566 (82%) reported that they had ever breastfed (weighted mean total breastfeeding duration was 15.6 months). [14]

It was concluded that breastfeeding significantly reduces the risk of cardiovascular disease, including coronary heart disease, stroke and death from these conditions. Breastfeeding women had an 11-17% lower risk of these conditions compared to non-breastfeeding women. A progressive reduction in cardiovascular disease risk was observed as the length of breastfeeding increased up to 12 months. Results for longer feeding periods are inconclusive. [14]

Although the meta-analysis showed significant associations, the high heterogeneity between studies limits the conclusiveness of the conclusions. In contrast, it is still certain that there is a strong association between breastfeeding and cardiovascular disease risk reduction regardless of age, number of births, follow-up time, and geographic region. In conclusion, the results confirm the benefits of breastfeeding on vascular disease risk reduction in nursing mothers. [14]

When discussing the impact of breastfeeding on the risk of cardiovascular disease, the effect of breastfeeding on the risk of type II diabetes cannot be ignored. In a prospective study and meta - analysis by Susanne Jager, breastfeeding was shown to affect a mother's lower risk of developing type 2 diabetes, independent of sociodemographic, lifestyle and reproductive risk factors. The results of a meta-analysis of cohort studies clearly indicate that breastfeeding leads to favorable metabolic changes, increased lipolysis during lactation, higher HDL cholesterol levels, reduced postpartum triglyceride levels and improved tissue sensitivity to insulin. [9]

Despite the long-term health benefits, the long time between the end of breastfeeding and the assessment of metabolic parameters may partially obscure these relationships. The wide variety of results and the reliance on retrospective data on breastfeeding duration make accurate analysis difficult, especially when it comes to the difference between exclusive and mixed feeding. [9]

As we see it, further research is needed to better understand the biological mechanisms of this phenomenon and the role of body weight, as well as to minimize errors from retrospective assessments. In conclusion, long-term breastfeeding plays an important role in reducing the risk of type 2 diabetes and improving the metabolic profile, justifying the promotion of breastfeeding as an effective strategy to prevent metabolic disease among women. [9]
The study, authored by Rabel Misbah Rameez, analyzed 4 studies for the association between lactation and diabetes, with a total of 206,204 participants. Breastfeeding for more than 12 months was associated with a 30% relative reduction in the risk of diabetes (pooled odds ratio, 0.70 [95% CI, 0.62-0.78]; $P < 0.001$). [10]

The role of fathers in the breastfeeding process

The fact is that there is a link between a father's support for a nursing mother and an improvement in the rate of exclusive breastfeeding. Studies have shown that fathers are eager to be involved in the breastfeeding process, but they need proper education and perinatal support to do so. [17] The problem is that as much as 83.6% of fathers still do not have enough knowledge about lactation, so we need an appropriate support model. [3]
Educating fathers is an effective tool in supporting women in breastfeeding. Educational programs that improve fathers knowledge in this area are extremely important. Behaviors such as helping with household chores, providing adequate rest and feeding conditions help women in the breastfeeding process. Involvement of fathers in perinatal care positively affects the health of mothers, newborns, as well as themselves. Partner support enhances women's sense of self-efficacy, eliminates concerns about not having enough milk, as well as combining breastfeeding with work life. The results show that joint education of couples is an effective method for improving breastfeeding practices. It is recommended to replace the traditional mother-infant model with an approach that includes both fathers. Further research should be focused on evaluating the effectiveness of this approach in different socio-cultural settings. [17]
Studies provide information on the positives of a "fathers supporting breastfeeding" strategy, in which fathers help mothers in multiple ways, and their actions indirectly influence decisions to initiate and continue breastfeeding. Several recent studies, however, point to a minor role for fathers in supporting breastfeeding, which may be due to a lack of knowledge on the subject. The introduction of innovative solutions to educate fathers about breastfeeding resulted in an increase in the percentage of breastfeeding women, as confirmed by statistical results ($p = 0.001$; <0.05). In addition, partner support influenced the reduction of anxiety in mothers, as confirmed by Spearman's test results ($p = 0.048$; <0.05). [3]

The role of midwives and nurses in the breastfeeding process

A total often articles were analyzed in a systematic review and meta-analysis by author Tianci Wang. Five of them examined midwives' knowledge, attitude and practice on the topic of breastfeeding, and positive results were reported ($p < 0.05$). The meta-analysis found that breastfeeding training programs influenced midwives' theoretical knowledge and practical skills (standardized mean difference = 1.33; 95% confidence interval, 0.98 to 1.68; $p < 0.01$) and their attitudes toward breastfeeding ($p < 0.05$).

The meta-analysis showed that breastfeeding training programs significantly improved midwives' breastfeeding knowledge and skills (standardized mean difference = 1.33; 95% confidence interval, 0.98 to 1.68; $p < 0.01$), as well as their attitudes toward breastfeeding ($p < 0.05$). [20]

The remaining five articles evaluated the impact of special training programs for midwives on the initiation, duration and rates of breastfeeding among nursing mothers. There was a longer duration of exclusive breastfeeding ($p<0.05$), fewer challenges associated with breastfeeding, such as inadequate milk production ($p<0.05$), a decrease in the number of breastmilk substitute administrations in the first weeks of newborns without medical reasons ($p<0.05$), and greater satisfaction with counseling among women ($p < 0.01$). However, no clear effect of training programs on breastfeeding initiation and rates was observed. [20]

The paper by Maria Sauanna Sany de Moura shows that technologies i.e. devices, equipment, machinery, tangible material resources, used especially by nursing staff, play a leading role in promoting breastfeeding. They facilitate the acquisition of knowledge, the establishment of relationships, and influence the effectiveness of activities. Hard technologies, i.e. facilities, equipment, machinery, tangible material resources, are the most commonly used to promote the transfer of knowledge and self-care practices. Soft technologies, which focus on communication and relationships with other people, also play a not insignificant role in the process of promoting breastfeeding. [18] The study also noted the need for professional training of medical personnel to adapt educational tools and strategies to the specific situation. [18]

Afsar Omidi's work also highlights the role of neonatal nurses in supporting lactation among women who breastfeed low birth weight (LBW) infants. These mothers have individual needs in this regard, due to a number of difficulties, such as ineffective suckling at the breast by the infant. The goal of education is to start feeding early, up to 6h afterbirth, and continue it until the baby is 6 months old. The role of nurses is mainly based on reducing barriers, as well as supporting nursing mothers. [24]

In the study by Theresa Bengough, the women experienced difficulties in their interactions with hospital staff, despite the fact that this type of support was seen by them as part of their caregiver role at a constitutional level. The women pointed to the unavailability of staff due to a flurry of duties, as well as high levels of professional burnout. Mothers also noted the lack of knowledge of midwifery staff regarding available support programs. Two studies found that women felt pressured due to the strong focus on breastfeeding by medical staff. [22] Education of mothers before childbirth and its impact on feeding efficiency

In the study by Rukiye Öztürk, 80 pregnant women meeting the criteria were included in the study. They were randomly divided into two groups: intervention (n = 40) and control (n = 40). Women in the control group received standard care, while those in the intervention group received standard care and breastfeeding education. In the first week after delivery, breastfeeding was assessed using the LATCH scale and the Breastfeeding Self-Efficacy Summary Scale (BSES-SF). The LATCH and BSES-SF scale scores were higher in the intervention group compared to the control group. It has been proven that breastfeeding self - efficacy is directly proportional to the breastfeeding tag's perception of self-efficacy. [23]

A systematic review by Mahalaqua Nazli Khatibevaluated the impact of different interventions on breastfeeding.

For this purpose, the authors included 6 systematic reviews in their study evaluating two endpoints: early initiation of breastfeeding (EIBF) and/or exclusive breastfeeding (EBF). Outcomes were assessed using two main comparison groups: intervention versus routine care, and one type of intervention versus other types of intervention. Results indicated improvements in EIBF and EBF rates among women who received a feeding intervention in the form of educational sessions and support, compared to women who received only standard care. [19]

Intervention using mobile devices did not result in improvement-no improvement in breastfeeding practices was seen in the intervention group using mobile devices for client contact. The highest improvement in early initiation of breastfeeding was achieved with community intervention packages delivered to pregnant and childbearing women during antenatal care and/or postnatal care by nurse midwives. [19]

The randomized, controlled intervention study by Müge Yılmaz was designed to determine the effect of breastfeeding education on breastfeeding mothers' knowledge and behavior, as well as exclusive breastfeeding for a period of 6 months. For this purpose, participants were randomly selected into two groups: training (n=60) and control (n=60) from among patients of obstetrics - gynecology polyclinics. [21]

Women in the training group were educated about prenatal and postnatal breastfeeding. Data were collected using a questionnaire on three occasions: on the day of admission to the hospital, at the 1st and 24th week after delivery, through face-to-face interviews. It was noted that the training carried out in the training group increased the number of correct answers. In this group, the difference between the number of good answers in the pretest and posttest was four, while in the control group it was two. The number of mothers who exclusively breastfed for 6 months was significantly higher in the training group (26.5%) compared to the control group (3.3%) (p=0.015). The median duration of exclusive breastfeeding was also longer in the training group (5 months) than in the control group (4 months) (p=0.013). In conclusion, the training of pregnant women and breastfeeding mothers increased their level of knowledge, the duration of exclusive breastfeeding and the rate of 6-month exclusive breastfeeding. [21]

Conclusions

Breastfeeding entails significant health benefits for the child and mother. It has an impact on reducing the risk of ascending cancers (breast cancer, ovarian cancer, endometrial cancer), cardiovascular disease and type II diabetes. These benefits are particularly evident in the perspective of long-term breastfeeding. Fathers' support and promotion of education on the benefits of breastfeeding are also important on breastfeeding practices. Public awareness-raising activities are recommended as strategies to improve breastfeeding outcomes and population health.

In order to understand the mechanisms responsible for the relationships described above and to eliminate methodological errors in retrospective studies, there is a need for further research.

Disclosure

Author's contribution

Conceptualization: Olga Krupa; Methodology: Bartosz Omasta; Software: Katarzyna Kamińska-Omasta; Check: Kuba Borys Romańczuk and Daria Rybak; Formal analysis: Kinga Furtak and Magdalena Agata Czerska; Investigation: Paulina Dorota Pietrukaniec and Szymon Przemysław Stolarczyk; Resources: Magdalena Agata Czerska and Zofia Martyna Wójcik; Data curation: Bartosz Omasta; Writing - through preparation: Olga Krupa; Writing - review and editing: Katarzyna Kamińska-Omasta and Kuba Borys Romańczuk; Visualization: Szymon Przemysław Stolarczyk and Zofia Martyna Wójcik; Supervision: Paulina Dorota Pietrukaniec; Project administration: Daria Rybak and Kinga Furtak; Receiving funding -no specific funding.

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